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## WHAT IS CLAIMED IS:

- 1. A semiconductor light-emitting device having a DBR (Distributed Bragg Reflector) and a light-emitting layer formed on a GaAs substrate, the DBR being located between the GaAs substrate and the light-emitting layer, in which light directed from the light-emitting layer toward a top surface has a radiation angle dependence, the semiconductor light-emitting device further comprising:
- a semiconductor layer having a number of layers

  of 1 or more is formed on the light-emitting layer, a top
  surface of the semiconductor layer being a roughened
  surface.
  - 2. The semiconductor light-emitting device according to Claim 1, wherein the light-emitting layer to be formed on the GaAs substrate is a single layer or a plurality of layers made of  $Al_vGa_zIn_{1-v-z}P$  ( $0\le y\le 1$ ,  $0\le z\le 1$ ).
  - 3. The semiconductor light-emitting device according to Claim 1, wherein the semiconductor layer whose top surface is a roughened surface is made of  $Al_xGa_{1-x}As$  (0 $\le x \le 1$ ).
- 20 4. The semiconductor light-emitting device according to Claim 3, wherein the semiconductor layer made of  $Al_xGa_{1-}$  As  $(0 \le x \le 1)$  is transparent to an emission wavelength.
  - 5. The semiconductor light-emitting device according to Claim 3, wherein the semiconductor layer made of  $Al_xGa_{1-}$
- 25  $_{x}$ As (0 $\le$ x $\le$ 1) has an Al mixed crystal ratio x of 0.5 0.8.

- 6. The semiconductor light-emitting device according to Claim 3, further comprising an  $\mathrm{Al_yGa_zIn_{1-y-2}P}$  (0 $\leq$ y $\leq$ 1, 0 $\leq$ z $\leq$ 1) layer for diffusing a current injected from an electrode provided on a light takeout side, the  $\mathrm{Al_yGa_zIn_{1-y-z}P}$  layer being provided between the semiconductor layer made of  $\mathrm{Al_xGa_{1-x}As}$  (0 $\leq$ x $\leq$ 1) and the light-emitting layer.
- 7. The semiconductor light-emitting device according to Claim 1, wherein the layer whose top surface is a roughened surface is made of  $Al_vGa_zIn_{1-v-z}P$  (0 $\leq$ y $\leq$ 1, 0 $\leq$ z $\leq$ 1).
- 10 8. The semiconductor light-emitting device according to Claim 7, wherein the layer whose top surface is a roughened surface has a lattice constant different by 0.5% or more from that of the GaAs substrate.
- 9. A method for manufacturing a semiconductor light15 emitting device having a DBR (Distributed Bragg Reflector)
  and a light-emitting layer formed on a GaAs substrate, the
  DBR being located between the GaAs substrate and the lightemitting layer, in which light directed from the lightemitting layer toward a top surface has a radiation angle
  20 dependence, the semiconductor light-emitting device
  manufacturing method comprising the steps of:

forming a semiconductor layer having a number of layers of 1 or more on the light-emitting layer; and thereafter roughing a wafer surface.

- 10. The method for manufacturing a semiconductor light-emitting device according to Claim 9, wherein the step of roughing the wafer surface includes a step of forming a pattern for scattering light onto the wafer surface by photolithography and etching.
- 11. The method for manufacturing a semiconductor light-emitting device according to Claim 9, wherein the step of roughing the wafer surface includes a step of abrasion the wafer surface.
- 10 12. The method for manufacturing a semiconductor light-emitting device according to Claim 9, wherein the step of forming the semiconductor layer having a number of layers of 1 or more on the light-emitting layer includes a step of forming a semiconductor layer including an  $Al_yGa_zIn_{1-}$
- 15  $_{y-z}P$  (0 $\le y \le 1$ , 0 $\le z \le 1$ ) layer, and the step of roughing the wafer surface includes a step of boiling the wafer in hydrochloric acid.
- 13. A method for manufacturing a semiconductor lightemitting device having a DBR (Distributed Bragg Reflector)

  20 and a light-emitting layer formed on a GaAs substrate, the
  DBR being located between the GaAs substrate and the lightemitting layer, in which light directed from the lightemitting layer toward a top surface has a radiation angle
  dependence, the semiconductor light-emitting device

25 manufacturing method comprising the steps of:

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forming on the light-emitting layer a semiconductor layer having a number of layers of 1 or more including an  $\mathrm{Al_yGa_zIn_{1-y-z}P}$  ( $0 \le y \le 1$ ,  $0 \le z \le 1$ ) layer having a lattice constant different by 0.5% or more from the GaAs substrate, thereby roughing a wafer surface.

14. The method for manufacturing a semiconductor light-emitting device according to Claim 9, wherein the step of forming on the light-emitting layer a semiconductor layer having a number of layers of 1 or more includes a step of forming on the light-emitting layer a semiconductor layer including an  $Al_yGa_zIn_{1-y-z}P$  ( $0 \le y \le 1$ ,  $0 \le z \le 1$ ) layer and an  $Al_xGa_{1-x}As$  ( $0 \le x \le 1$ ) layer, and the step of roughing the wafer surface includes a step of treating with dilute hydrofluoric acid or dilute nitric acid.